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Formalisation of the Informal: Can Vertical Community Spaces Enable Equitable High-Density Slum Upgrades in Bangkok?

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ABSTRACT



By 2050, nearly 68% of the global population will reside in urban areas, while 1.6 billion people already inhabit informal settlements lacking tenure security, basic services, and public space. This study explores whether vertically integrated community spaces can enable medium- to high-rise slum upgrading in Bangkok, where land scarcity constrains conventional low-rise approaches. A research-by-design methodology, conducted through a postgraduate studio in collaboration with a local community, informs the investigation. Spatial analysis, mapping, and participatory processes guided the development of modular walk-up block proposals, featuring stacked semi-public 'streets-in-the-sky' and compact communal spaces. These configurations offer vertical social interaction zones, economic potential via shophouses above ground level, and environmental benefits through enhanced daylight penetration and cross ventilation. Findings indicate an improved sense of belonging, social cohesion, and place identity despite vertical displacement. Vertically shared spaces demonstrate capacity to align high-density urban forms with evolving informal practices, providing a replicable, climate-responsive model for inclusive regeneration in rapidly urbanising contexts across the Global South.

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Highlights:

- This paper highlights informal settlements are not a problem to be solved but rather a condition to be understood.
- This research suggests the need for community participation in the development of slum upgrading projects in the Global South as part of sustainable urbanization practices.
- Vertical common or public spaces in high-density medium- to high-rise projects go beyond physical implications, but can also potentially reduce urban inequalities and enhance community resilience.

Contribution to the field statement:

This paper contributes to understanding the potential of community participation for informal settlement upgrade projects in Southeast Asian cities, as well as the socio-economic and environmental opportunities offered by the provision of vertical semi-public common spaces within such projects, as a way to reduce urban inequality and enhance community resilience.

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1. Introduction

Rapid urbanisation continues to redefine the global demographic landscape. At present, 55 % of the world's inhabitants reside in urban areas, and this proportion is projected to reach 68 % by 2050 (United Nations Department of Economic and Social Affairs [UN DESA], 2019). While the Global North experienced an extended, two-century transition to majority-urban status—crossing the 50 % threshold in 1940—the Global South is undergoing the same demographic shift at unprecedented speed and scale, moving from 18 % urban in 1950 to an anticipated 56 % by 2030 (United Nations Human Settlements Programme [UN-Habitat], 2014). Such acceleration contributes to the proliferation of slums and informal settlements: recent estimates suggest that 1.6 billion people already live in such conditions and that their number may climb towards three billion by mid-century (Boanada-Fuchs, Kuffer, & Samper, 2024; UN-Habitat, 2014).



Figure 1. Informal settlements along the canal in Khlong Toei, Bangkok, Thailand.

Asia sits at the epicentre of these transformations, currently housing 54 % of the world's urban population—over 2.2 billion people—and standing at 51 % urbanised overall (UN-Habitat, 2020). The region's cities enlarge by more than 40 million residents each year—well over 100,000 people per day—propelling a proliferation of megacities such as Bangkok, Ho Chi Minh City and Jakarta (Asian Development Bank [ADB], 2011). This velocity of growth strains infrastructure amplifies environmental degradation and deepens socio-economic disparities, particularly through the expansion of informal settlements whose footprints, densities and internal morphologies remain to be better understood (Ren et al., 2020; Visagie & Turok, 2020).

Within South-East Asia, urbanisation patterns vary markedly—from 22 % in Cambodia to roughly 50 % in Thailand and Indonesia, and 100 % in Singapore (Association of Southeast Asian Nations [ASEAN], 2022). In 2015, 47 % of the ASEAN population lived in urban areas; by 2030 this share is expected to reach 56 %, equating to some 405 million urban dwellers (ASEAN, 2022). Yet the benefits of urban growth remain unevenly distributed. Rising land values in central districts, coupled with limited affordable housing supply, push low-income households into marginal or interstitial spaces, leaving them vulnerable to eviction and chronic tenure insecurity (UN-Habitat, 2020).

Thailand—Southeast Asia's second-largest economy—offers a pertinent context for examining slum upgrading. Through a combination of top-down state initiatives and bottom-up community mobilisation, the country's *Baan Mankong* (secure housing) programme has enabled numerous informal communities to obtain tenure security and infrastructural upgrades. Nevertheless, Bangkok's dwindling supply of large, affordable land parcels now challenges the predominantly low-rise model on which such upgrade models were premised. Significant knowledge gaps persist concerning how medium- to high-rise, community-engaged upgrades might operate within the city's intensifying density and land-value pressures. Consequently, this research asks: What social, economic and environmental implications arise when vertical community spaces are incorporated into medium- and high-rise slum-upgrade projects in Bangkok?

To address this question, the study explores a research-by-design studio conducted during the 2023–2024 academic year at Thammasat University. Partnering with a local resettling community in

Chatuchak District, the studio employed mixed spatial analysis and mapping as well as community participation to propose designs for modular walk-up blocks that layer semi-public ‘streets-in-the-sky’, pocket common spaces and recreational zones. By foregrounding community participation, the studios sought to reconcile formal housing standards with informal livelihood practices, thereby supporting residents’ Right to the City.

The paper proceeds as follows. First, it reviews the literature on informal settlements—definitions, prevalence and upgrading strategies in Thailand—situating the discussion within wider housing-policy debates. Second, it outlines the research-by-design methodology used to interrogate high-density, community-led upgrades. Third, it presents the two case-study proposals, contextualising them within their urban and socio-cultural milieu (Figure 2). Fourth, the discussion evaluates the environmental, social and economic opportunities and potential outcomes of vertical semi-public common spaces, referencing participatory feedback. Finally, the conclusion reflects on the broader implications for equitable, climate-sensitive slum upgrading across rapidly urbanising cities of the Global South and identifies avenues for future research on post-occupancy evaluation and financing mechanisms.

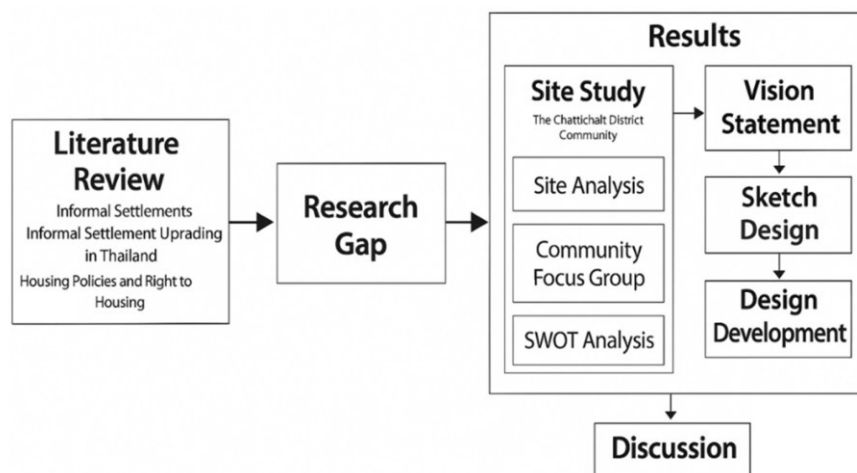


Figure 2. Structure of the Study.

2. Literature Review: Informal Settlements

Nowadays, the world is facing a severe urban housing crisis, with 1.6 billion people lacking adequate housing, of which one billion live in slums or informal settlements (UN-Habitat, 2020). According to the UN Department of Economics and Social Affairs, slums are urban areas in which housing is of poor quality and inadequate services, failing to meet at least one of the key conditions including access to improved water sources, access to improved sanitation, sufficient living areas, tenure security, and housing durability (UN DESA, 2020). Moreover, the prevalence of slums is driven by various forces such as rapid urbanization; ineffective planning; lack of affordable housing; ineffective urban and housing policies; lack of housing finance; and cycles of poverty and low incomes (UN-Habitat, 2020).

This crisis tends to be exacerbated by the failure of the state to adequately regulate the private housing market and inadequate attention to affordable or public housing (UN-Habitat, 2020). As a result, the cost of private housing has risen beyond the reach of low-income residents, forcing them to reside in slums in the suburbs or on the city’s periphery, often in undeveloped spaces (UN-Habitat, 2020). These settlements often emerge spontaneously, unplanned and beyond state control, and are characterized by high density, congestion, poor environmental conditions, and recognized as messy or chaotic (Kamalipour, 2016; García-Villalba, 2015). In addition to the illegal occupation of informal clusters of temporary structures on the urban fringe, informal settlements are often self-constructed dwellings made from waste or recycled materials such as wooden boards or iron sheets and do not have formal building permits, thus being unauthorized or illegal constructions

(Kamalipour, 2016; Yap & De Wandeler, 2010; Suhartini & Jones, 2023). Furthermore, settlements located near the coast, rivers, canals or other water sources are vulnerable to environmental hazards, exacerbated by climate change, especially floods and heavy rains in Southeast Asia.

The global proliferation of slums is accelerating at an alarming pace, particularly in developing nations across Asia and Africa, such that the growth of informal settlements accompanying rapid urbanization is occurring at a rate of development that is unpredictable, where urban expansion typically corresponds with the formation of slums (UN-Habitat, 2012). Urban informalities, whether it be housing or economy, is both a process and a product, such that they are simultaneous modes of insurgent spatial production and regulation that typically occur through a condition of exceptionality (Kamalipour & Peimani, 2020; Sweeting, 2017). Urban informalities are developed in a self-organized manner, emerging organically and incrementally, however, this has become the norm rather than a deviation in the Global South, such that informality forms an integral part of both housing and economic activities (Kamalipour, 2016; UN-Habitat, 2020). Nevertheless, informal settlements can also demonstrate inventiveness, provide livelihoods, and be a vibrant place of residence, challenging conventional understandings of illegality and disorder (Kamalipour, 2016).

Similarly, public spaces are essential to street vendors and informal markets, open spaces such as passageways or other common areas in informal settlements play a critical role in the daily lives of families, where narrow streets are needed for keeping street vending units and motorcycles, or where a household may conduct some commercial or industrial activity (Usavagovitwong et al., 2013). In informal settlements, low-rise houses typically integrate residential and commercial, or spaces for rent as storefronts for home-based businesses (Usavagovitwong et al., 2013; Thai et al., 2022).

In contrast, Thailand's National Housing Authority's (NHA) supply-driven government-led public housing programmes tend to be designed vertically and taller to accommodate many households in a single block, but at the expense of ground-level public open spaces, which are essential for business operations and social interactions (Usavagovitwong et al., 2013). Therefore, improving housing for informal residents requires a comprehensive approach that not only focuses on housing, but also considers the residents' physiological needs (food, water, sanitation), security (economy, employment, health, education), and belonging (social identity, connection), along with open spaces for informal and income-generating activities, providing daily living for low-income households (Maslow, 1954; Usavagovitwong et al., 2013).



Figure 3. Public housing of National Housing Authority in Bangkok (left) and CODI Pathum Thani Model, relocated community in Pathum Thani, Thailand (right).

2.1 Informal Settlement Upgrading in Thailand - Formalising the Informal

Thailand has implemented top-down public housing strategies to tackle slums and informal settlements, such as the NHA social housing, but has also initiated bottom-up demand driven-approaches, particularly the *Baan Mankong* or secure housing programme operated by the Community Organizations Development Institute (CODI), a government institution under the Ministry of Social Development and Human Security. Acting as a key connection between formal

and informal systems, the *Baan Mankong* programme is a participatory approach towards upgrading, formalising, and legalizing communities through community-based savings, ownership, and execution, so as to improve the livelihoods of the people.

As indicated by the prior director of CODI, Somsook Boonyabancha, before the establishment of *Baan Mankong*, people lived under the persistent threat of displacement, where the only idea was to push slums and areas of illegal housing out of the city, without legally addressing the situation of these poor communities or their violations of various laws (Boonyabancha, 2006). As a consequence, the core principle of CODI's *Baan Mankong* programme is the transition of land tenure status from illegal to legal, and thus the formalisation of the informal, which in turn alters the relationships between the slum or squatter communities and the urban authorities due to the acceptance and legitimation of disadvantaged or marginalized urban populations as being integral parts of the city (Boonyabancha, 2006).

Baan Mankong is a people-oriented community upgrading initiative with a bottom-up, participatory approach, in which the community, as the collective owners of the project, are key decision-makers at every stage of the project, from design to implementation and construction (Boonyabancha, 2006; Usavagovitwong et al., 2013). The communities themselves, with the establishment of community savings groups and administrative representatives, take responsibility for the overall management of repayment of flexible, soft low-interest loans for land purchase or housing construction (Boonyabancha, 2006; CODI, 2005; Usavagovitwong et al., 2013).

Since its launch in 2003, the CODI *Baan Mankong* programme has employed five key approaches to upgrade informal settlements, namely: 1) on-site upgrading, 2) reblocking, 3) land sharing, 4) reconstruction, and 5) relocation. The first method of on-site upgrading refers to the physical improvement of the living conditions and essential services whilst preserving its location, identity, and community structure (CODI, 2005). The second approach of reblocking involves the organized improvement of the existing settlement by improving the layout of the building cluster/s, with the realignment of blocks and streets, as well as the installation of sewers and drains, developing better walkways and roads, while moving as little houses as feasible (CODI, 2005).

The third approach of land sharing refers to the negotiation between the community and the landowner for sharing or dividing the land, such that a part of the land is purchased or rented for housing development, and in return the landowner retains the remaining land for commercial or public development (CODI, 2005). The fourth approach of reconstruction refers to when existing settlements are completely removed and reconstructed on the same land under a long-term lease or through a potential full land purchase (CODI, 2005). Similar to the reblocking strategy, the new reconstructed development could have new block and street layouts for better land and infrastructural optimization (García-Villalba, 2015). Finally, the fifth approach of relocation refers to the construction of houses at a new site, which becomes applicable if the previous four on-site strategies are not possible. There are both nearby resettlement locations, for sites within three kilometers of the initial community, and distant relocation, to sites further than three kilometers. Nevertheless, the trade-off for distant sites is more housing stability and land tenure rights (CODI, 2005).

Regardless of the upgrading approach, public spaces play a key role in the community's development. Even though there are narrow misaligned walkways or passages fronting each house in existing dense informal settlements, the fundamental issue is not so much the limitation of quantity of public open spaces, but moreover, the limitation is with regards to their quality. Thus, in the city-wide informal settlement improvement initiative of the CODI *Baan Mankong* programme, the development of the street or courtyard as a fundamental public space becomes a key design consideration. The design and implementation of streets in *Baan Mankong* projects, whether newly created or by the realignment of blocks, should maximize the use of the land and the setting of infrastructure. Hence, the public space design not only establishes the physical environment and setting of the neighborhood, but also helps to cultivate a deep sense of community, and strengthen

social relationships and local economies, such that it is not the physical space that matters, but rather what that space enables (García-Villalba, 2015).

However, given the socio-cultural challenges in moving from a horizontal lifestyle to a vertical setting in medium- or high-rise buildings due to development constraints in optimizing as many units as possible in limited land area, slum upgrade projects need to address how neighbours can gather for socialization, meetings, or other kinds of interactions, albeit in a vertical manner. This aligns with the New Urban Agenda which describes how urban planning and design should provide a social mix of housing “with access to quality basic services and public spaces for all, enhancing safety and security and favouring social and intergenerational interaction and the appreciation of diversity” (UN-Habitat, 2016).

2.2 Housing Policies and Right to Housing

Before moving onto the results and discussion sections, it is worth understanding slum upgrades in the context of rapid urbanization, market-driven property, and the social-economic challenges associated with these issues, in particular, spatial justice and housing rights (Rigon, 2022; Saiz, 2023). In neoliberal urban development, housing is seen as a form of commodity, to be bought, sold, and speculated, rather than as shelter and a fundamental human right. Thus, in 2003, the Thai government initiated the one million units low-income housing policy, divided into two nationwide programmes namely, the NHA *Baan Eua Arthorn* (home with care) programme for some 600,000 units, targeted for low-income households, and the CODI *Baan Mankong* (secure housing) slum upgrading initiative for around 300,000 units (Usavagovitwong, 2012). To this day, NHA social housing, which is more top-down, and *Baan Mankong*, which is bottom-up, continue to serve these populations, albeit with changes since 2003.

As more contemporary condominiums and highrise apartments continue to be built in the capital of Bangkok, low-income households coming into the city for opportunities continue to have nowhere to live other than informal settlements, reiterating the vicious cycle of inequality and housing unaffordability. Amidst a market-driven urban development approach that supports the economic growth of cities such as Bangkok, where private property rights are seen as a right to transfer rather than a right to adequate housing (Shelby, 2017), urban informality, according to literature, becomes a norm or a way of life, or a form of survivalism in the city, particularly in the Global South (AlSayyad & Roy, 2003; Davis, 2006; Roy, 2012).

The ongoing housing crisis prompts further action and the continued need for housing programmes in the country. A recent government-supported housing initiative, called *Baan Puea Kon Thai* (Homes for Thais), aims at new housing estates for low-income households, while adhering to eligibility criteria such as 50,000 THB per month salary limit, aged 20 or above, and never owned any housing, amongst others, raises the critical issue of the sustainability of these housing policies and programmes over time, whether top-down or bottom-up (Chantanusornsiri, 2025). The first generation implemented CODI *Baan Mankong* projects were considered successful due to being closely connected to the original founding principles of the programme such as strong community ties, a well-established sense of place, and a feeling of belonging. However, over time these ideals have differed from community to community, due to various circumstances.

Despite several key limiting factors which pose challenges for *Baan Mankong*'s successful continuation, including lengthy procedures and implementation issues, land negotiation and acquisition for communities, and households lacking the financial capability to pay off long-term mortgages, the programme has served to ameliorate the issue of slums in the country. The programme provides legally recognised land tenure for communities as an alternative to private property rights, which also brings communities together as a unit, as part of a wider social movement in the Global South towards social equity (Shelby, 2017). *Baan Mankong* has helped uplift low-income communities allowing them to uphold their “right to adequate housing for all as a component of the right to an adequate standard of living” (UN-Habitat, 2016).

The foregoing discussion about social equity and property rights situates this study in the framework of the ‘Right to the City’ in the proposition of community-engaged high-density slum

upgrades with vertical community spaces on legally tenured land. Lefebvre's and Harvey's 'Right to the City' is about the right of citizens to participate in the decision-making processes and shape the development of their urban environments, particularly those who are most vulnerable, challenging the dominance of neoliberal market forces thus arguing for inclusivity and spatial justice in cities (Harvey, 2008; King, 2018). The Right to the City is more than simply an individual's liberty, claim, or access to urban resources such as property, but rather "a right to change ourselves by changing the city" (Harvey, 2008, p. 23; King, 2018). Low-income communities can therefore exercise their Right to the City, not only in terms of access to housing, but also participate and be included in the city, as adequate housing is a foundation for socially inclusive, spatially just, resilient, and sustainable cities.

3. Methodology

This study adopts a research-by-design methodology to investigate the potential of vertical community spaces in enabling medium- to high-rise slum upgrades in Bangkok. Rooted in practice-based inquiry, research-by-design facilitates critical spatial exploration and hypothesis testing through iterative design processes, grounded in real-world contexts. In this case, the method was operationalised through a postgraduate academic design studio, enabling a collaborative, analytical, and participatory investigation into the formalisation of informal settlements in Thailand's capital.

The research is based on two case study projects developed during the second semester of the 2023–2024 academic year as part of the Master of Urban Design and Development programme at the Faculty of Architecture and Planning, Thammasat University, Thailand. The design studio aimed to interrogate the socio-economic, environmental, and spatial implications of community-based slum upgrade strategies in contexts where horizontal expansion is no longer viable due to land scarcity and rising urban densities.

The studio was organised around a stepwise design-research framework, which began with multi-scalar spatial analyses of the site—at provincial, district, and neighbourhood levels—followed by SWOT (Strengths, Weaknesses, Opportunities, and Threats) analysis, site visits, and participatory activities. Community engagement was embedded in the process, including focus group discussions, demographic profiling, and informal interviews to gather socio-economic data and to inform design decisions based on local needs and perceptions.

Two exemplary student projects are selected for detailed analysis in this paper. These were developed by international postgraduate students from Japan and Vietnam, with academic backgrounds in architecture and urban planning, respectively. The projects integrated participatory planning approaches, allowing for the co-creation of design strategies in partnership with residents from a resettling informal community in Bangkok's Chatuchak District. These participatory sessions were particularly vital in establishing residents' priorities, identifying spatial practices of informal livelihoods, and generating feedback on preliminary design proposals.

The design outputs were developed through an iterative process, combining hand-drawn concept sketches, computer-aided design (CAD), and Building Information Modelling (BIM). Designs were evaluated based on their social, economic, and environmental opportunities and potential.

By integrating qualitative insights from community stakeholders and international best practices, this research-by-design methodology contributes a holistic and context-sensitive understanding of how verticality can be reimagined to support inclusive, sustainable, and climate-resilient slum upgrades in Bangkok. The next section presents and analyses the spatial design proposals derived from this process.

4. Results

As a practical example of a *Baan Mankong*-style project at its early stages, the Urban Design and Development International (UDDI) programme's informal settlement improvement design studio, conducted at Thammasat University shows how public space design, both on and above the ground floor, plays a crucial role in the proposed regeneration of a community. This project, incorporating

both group and individual components, was based on a real world scenario and developed in collaboration with CODI's *Baan Mankong* initiatives in the Bangkok area.

Students analyzed and proposed alternative spatial solutions for an existing informal settlement, the Chatuchak District community, in the Bangkok Metropolitan Area, Thailand. The key focus of this project was not only the street or courtyard as urban commons, a public space serving the residential neighborhood, but given the scale of the site and the number of units it had to accommodate, public or semi-public open spaces were proposed above ground to explore a vertical network of common spaces throughout the building. This design study provided students with the opportunity to engage in public or common space design in the context of a real-world informal settlement relocation initiative which was then presented to the community for their feedback. The designs were developed based on a comprehensive understanding of the challenges and opportunities presented by the site identified via contextual analyses and fieldwork.

4.1 Site Introduction and Analysis - Relocation

The postgraduate Urban Design and Development studio is a practical module that combines the comprehensive knowledge of spatial analysis in urban design with cultural and social analysis, presented here in relation to community participation and engagement in a slum upgrade project. The study site is located in the Chatuchak District, in Bangkok, near the Bang Sue Grand train station. The project involved multiple communities to be merged into one potential site, following the aforementioned relocation approach. The students engaged in focus group discussions facilitated by a guest instructor who helped with the translations, which sought to profile the community in terms of the household sizes, occupations, cost of living, range of household incomes, transportation modes, educational and medical access, as well as daily routines.

The study specifically involved five communities within the Chatuchak and Bang Sue area that would come together into a trapezoidal site with a total of 192 households, having an average of four people per household. The community members are mainly low-income workers (earning around 400-500 THB/day/household) who are engaged in jobs such as motorcycle taxi drivers, and street vendors, as well as small businesses such as grocery or food trading. The pace of life is fast with people from multiple generations connected through many interactive activities. Moreover, the community expressed interest in more spaces for community activities as well as a market space for both trading and living.

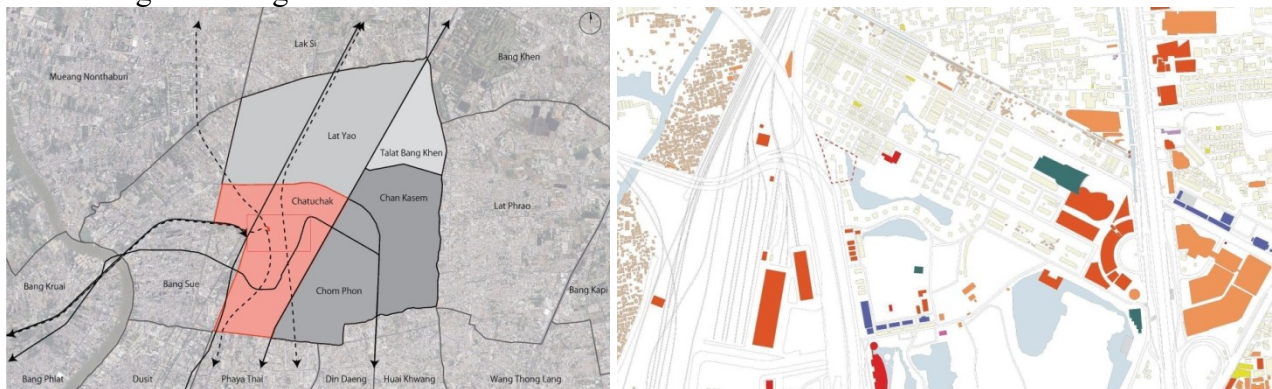


Figure 4. Chatuchak district and building-use maps of Chatuchak community and surroundings.

Within the study area, along the main road to the east, there are large shopping malls and offices, including the PTT Power Complex. To the west are railways, main roads, expressways, and a large State Railway of Thailand (SRT) train depot. Some informal settlements and a few shops are located along the canal to the north. There are many bus stops and other public transport facilities, all within walking distance of the community. Moreover, Bang Sue is an area with many future developments, as it is likely to be a new centre for Bangkok (see Figure 4).

The study site poses many challenges and opportunities. Although there are many surrounding facilities, there is only one small hospital. There are several large green parks (Wachirabenchathat Park, Chatuchak Park) including some sports fields, but these are not easily accessible to the public.

Moreover, there is a lack of green spaces around the site for the community. There are many large unused spaces on the riverbank or under the overpass. Schools and SRT red line, BTS as well as MRT for public transportation around this area are not too far from the community but are disconnected by the main road making them difficult to access. Following their contextual analysis, the students developed a joint vision for this project which was to design a new living complex for the community with more public spaces for community and children activities, provide more connectivity and accessibility, as well as improve the living environment.

4.2 Case Study 1: Multiple Building Clusters

In the first project by Toan Le Phuc, the scheme originated from an idea of creating open spaces and physical connections, where the households were arranged into a series of blocks to allow for continuous movement and take advantage of the gaps created between the blocks to create a community open space. Initially, the idea was to arrange the households at low density designed only on the ground floor which covered a larger site area, however, another scheme was developed to reduce the site coverage and increase vertical density, thus making more open spaces between the buildings (see figure 5).

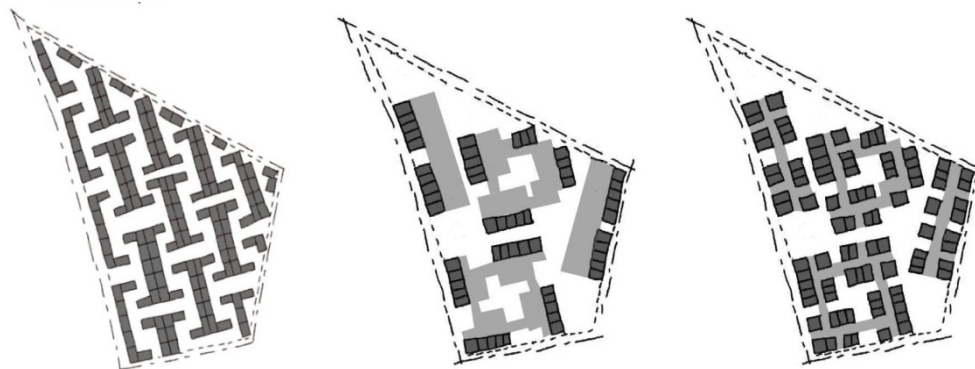


Figure 5. Sketch designs of low-density (left) and high-density (middle and right) schemes of Toan Le Phuc's project.

In this second scheme, there is a combination of three different types of apartments, including 96 Type A units (21m² over 2 levels), 12 Type B units (21m² over 3 levels), and 88 Type C units (30m² on 1 level), totalling 196 units over four floors. The main difference between the floors of the building is the change in the horizontal placement or position of the units, which created gaps between the households (see Figures 6-7).

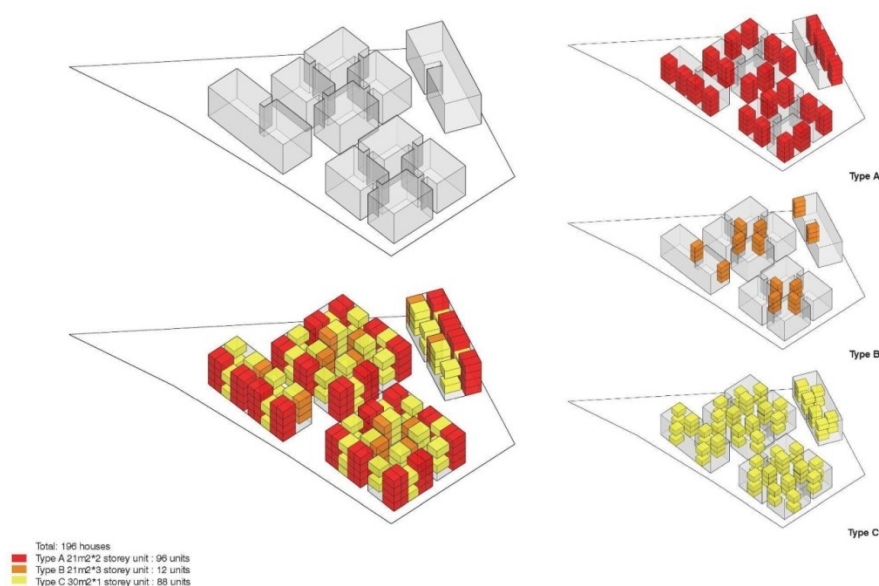


Figure 6. 3D Diagram of unit types of Toan Le Phuc's project.



Figure 7. Floor plans of Toan Le Phuc's project.

As seen in the floor plans, the units are arranged in an alternating manner so that they change positions when going from floor to floor. Due to the alternation of units from floor to floor, this creates pocket spaces between the households for socialization and informal gatherings. The circulation of the building is continuous throughout each level, with pocket spaces distributed on the sides, which can be seen in Figure 8.



Figure 8. Section showing alternating vertical open spaces of Toan Le Phuc's project.

By developing vertical pocket spaces on alternating floors, creates semi-outdoor spaces for community interactions around the building, along with the courtyards in the middle of the blocks. In addition, there is more space for landscaped community areas on the ground floor, as well as space for commercial activities to best serve the needs of the community, particularly adjacent to the courtyards where there is more spatial connectivity.

4.3 Case Study 2: Building with Central Courtyard

The second project by Shun Yamai, in contrast, is a building complex with a large singular courtyard. Similar to the previous scheme, the building is composed of three unit types, 100 Type A units (42m²), 43 Type B units (63m²), and 50 Type C units (30m²), totalling 193 units distributed over four floors.

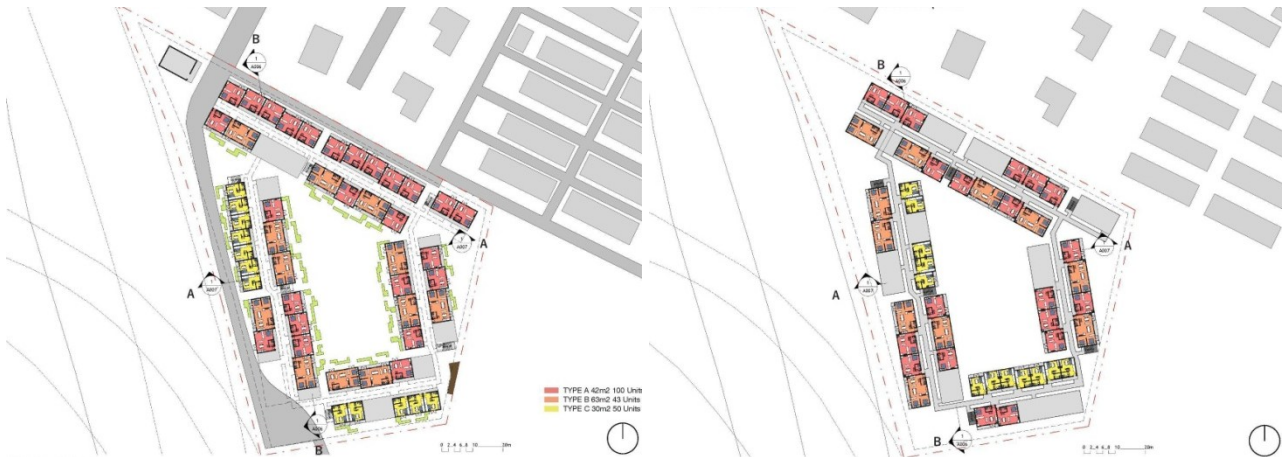


Figure 9. Floor plans of Shun Yamai's project.

The change in layout between the floors of the building is due to the shifting placement of the units, which produced alternating open spaces between the households (Figure 9). The floor plans demonstrate how the various unit types are placed in a staggered arrangement so that open spaces appear at different locations between each level. Similar to the previous scheme, this creates semi-outdoor pocket spaces between the units for social gatherings and informal interactions. The circulation here is like a continuous bridge throughout each level, with common spaces distributed at the corners. The diverse range of open spaces in this scheme, both on the ground level and above ground, gives the design a highly eventful and interconnected quality.



Figure 10. 3D plan of Shun Yamai's project.

Like the previous scheme, Shun's design was developed to reduce the overall site coverage by increasing the vertical density, thus producing the large landscaped community courtyard seen in the middle which can also hold commercial activities (Figure 10). With multiple passageways into the courtyard, the design allows for variation in people's movements and promotes informal or chance encounters.

5. Discussions

5.1 Opportunities of Vertical Common Spaces

The two designs described in this paper demonstrate the innovative use of semi-public common spaces within the informal settlement upgrade in a site of limited area. This section will discuss some of the environmental, social, and economic opportunities offered by the development of these vertical common spaces.

With urban design's main role of defining public spaces, such spaces should be conceived as positive open spaces produced by the surrounding negative volumes of the buildings, and not simply seen as the residual spaces between building masses. This design studio places emphasis on the primacy and significance of semi-public spaces for the community both on the ground level and above ground. In the students' proposed masterplans and building designs for the informal settlement relocation, space is primary, framed by the built volumes, and promotes community engagement such as social activities, gathering with neighbours, intergenerational recreation, food vending, or other social-economic activities. Such community spaces permit the coexistence of informal and formal, unplanned and planned, disorder and order, thus challenging the continuum of formal to informal.



Figure 11. Perspectives showing common spaces in Shun Yamai's project.

In Shun Yamai's project, the units above ground are connected and accessed by open-air corridors, with voids between the units and the corridors, such that the corridors effectively act as a bridge, which provides numerous environmental benefits. By proposing open-air corridors or bridges, this allows natural light to vertically penetrate deeper into the building, while also allowing fresh air into the corridors. A conventional double-loaded corridor would mean long corridors requiring artificial light for illumination, but with limited costs for electrical installation and operation, these open-air corridors allow for natural lighting and ventilation. More importantly, the units have the opportunity for cross ventilation. In typical double-loaded corridors, the corridor-facing wall would not have a window, but in this design, facilitated by the void between the unit and the 'bridge', a window can be included to create a sense of an 'exterior' within the interior and allow the units to have windows on opposite sides to facilitate cross ventilation.



Figure 12. Perspectives of common spaces in Toan Le Phuc's project.

The designs demonstrated in this paper both illustrate an example of modular housing units with vertical community spaces indicative of sustainable urban housing strategies for low-income communities. Such ideas of common areas above the ground can help to address potential socio-

cultural challenges in the transition from traditional low-rise informal settlements to high-density housing which are typically not very accommodating in terms of horizontal living patterns. Moreover, such medium-rise high-density apartment buildings will typically not have a lift/elevator to save installation, operation, and maintenance costs. This makes the circulation particularly important to the design of the movement, but also a key opportunity for community interactions. The fundamental needs for gathering and socializing, children playing, drying of clothes, and conducting informal activities as they would on the ground are here reconceived above the ground in open-air corridors and pockets of common spaces. Such vertical common spaces therefore facilitate the communities' Right to the City, not only in the participatory and collective ownership of such a project, but also in their eventual development of a sense of community, identity, and belonging, where the people can go about their everyday activities and maintain socio-cultural continuity in semi-public spaces vertically distributed throughout the building (García-Villalba, 2015; UN-Habitat, 2020).



Figure 13. Cafe Apartments, Ho Chi Minh City, Vietnam.

The Cafe Apartments in Ho Chi Minh City, Vietnam, provides a distinct case or precedent study for such medium- to high-rise high-density housing projects, showing the opportunity for commercial activities in a vertical manner (see figures 13-14). Such case studies can inform the design process as a form of research, to show students or potential communities how to optimize economic opportunities by turning units essentially into 'shop-houses' above ground, with their brand clearly visible on the public facade, and the corridor becomes effectively a 'street-in-the-sky', as per Alison and Peter Smithson's concept of public hallways connecting the units above ground (Cunha & Marat-Mendes, 2019).

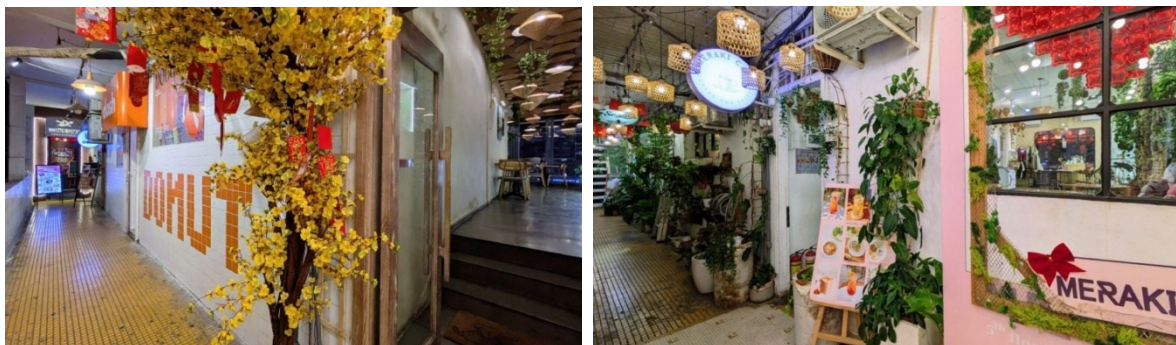


Figure 14. Interiors of Cafe Apartments, Ho Chi Minh City, Vietnam.

Another key case study in order to compare high-rise slum upgrades in other cities in Southeast Asia is Kampung Aquarium in Jakarta, Indonesia. This slum upgrade project is an interconnected cluster of high-rise buildings with common spaces above the ground level, designed as setbacks along the corridors. A unique feature of Kampung Aquarium is the split-level floors which encourage social interactions to foster a sense of community among the residents. The wide corridors, around four meters in width, are instrumental in preserving the traditional kampung or village lifestyle in a vertical setting, such that these hallways become spaces for gatherings or even workshops between neighbours.

5.2 Implications and Future Research Directions

Although evaluation metrics are beyond the scope of the one-semester design studio outlined in this paper, these can however be useful for further investigation. Particularly, the environmental benefits from deep daylighting and natural ventilation, though having precedent in housing projects from Hong Kong to Australia, could nevertheless benefit from modelled measurements or simulations. The socio-economic advantages of the courtyards and vertical common spaces would also benefit from further community feedback. Additionally, an evaluation matrix linking the proposed spatial interventions to socio-economic indicators from shop-house turnover or job retention, to the cost of living savings (indicated by survey percentages and average daily incomes, for instance), would allow for potential post-occupancy evaluation.

6. Conclusion

This study set out to determine whether vertically integrated community spaces can support equitable, medium- to high-rise slum upgrading in Bangkok, where escalating land values increasingly constrain ground-oriented or low-rise redevelopment. Adopting a research-by-design methodology, two case study studio designs partnered with a resettling community in Chatuchak District were proposed that demonstrate modular walk-up blocks which stack semi-public ‘streets-in-the-sky’, pocket common spaces and recreational zones.

The key findings can be summarised as follows. The design strategies demonstrated in this paper show various potential implications for medium- to high-rise slum upgrade projects including social spaces for gathering in a vertical setting, economic opportunities in terms of ‘shop houses’ above the ground level, as well as environmental benefits in terms of deep daylighting and natural cross ventilation. The design feedback indicated that the community saw in these projects the potential for higher levels of belonging, cohesion and place identity despite vertical relocation, corroborating arguments for the socio-cultural value of informal spatial practices within formal housing structures.

Collectively, these results suggest that vertical common spaces function as socio-spatial mediators, reconciling density imperatives with the informal livelihood practices that sustain low-income communities. When embedded in a participatory upgrade framework—such as the Community Organisations Development Institute’s *Baan Mankong* model—verticality can thus deliver social, economic and environmental co-benefits. These insights align directly with the New Urban Agenda’s call to “leave no-one and no place behind” (UN-Habitat, 2016) and reinforce multiple Sustainable Development Goals, notably SDG 1, SDG 10 and SDG 11.

Limitations of the present research include its reliance on design-studio prototypes rather than built projects, the relatively small sample of resident participants, and the use of rule-of-thumb daylight metrics instead of full dynamic simulations. Moreover, financing mechanisms for vertical upgrades—particularly for construction and long-term maintenance—are yet to be explored.

Future research should therefore (a) undertake post-occupancy evaluations of completed vertical-upgrade projects to validate social, economic, and environmental performance; (b) examine alternative funding and tenure structures that can secure affordability over time; and (c) expand the geographic scope beyond Bangkok to test transferability across diverse socio-climatic contexts in the Global South (Boanada-Fuchs, Kuffer, & Samper, 2024; Ren et al., 2020).



In conclusion, urban informality ought not to be framed solely as a deficit to be eradicated but as a repository of adaptive capacity. By integrating vertical community spaces that accommodate informal social and economic practices, cities can transform density from a threat into an opportunity—advancing inclusive, sustainable and climate-sensitive regeneration that formalises the informal without losing community identity or sense of place.

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The authors declare no conflicts of interest.

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